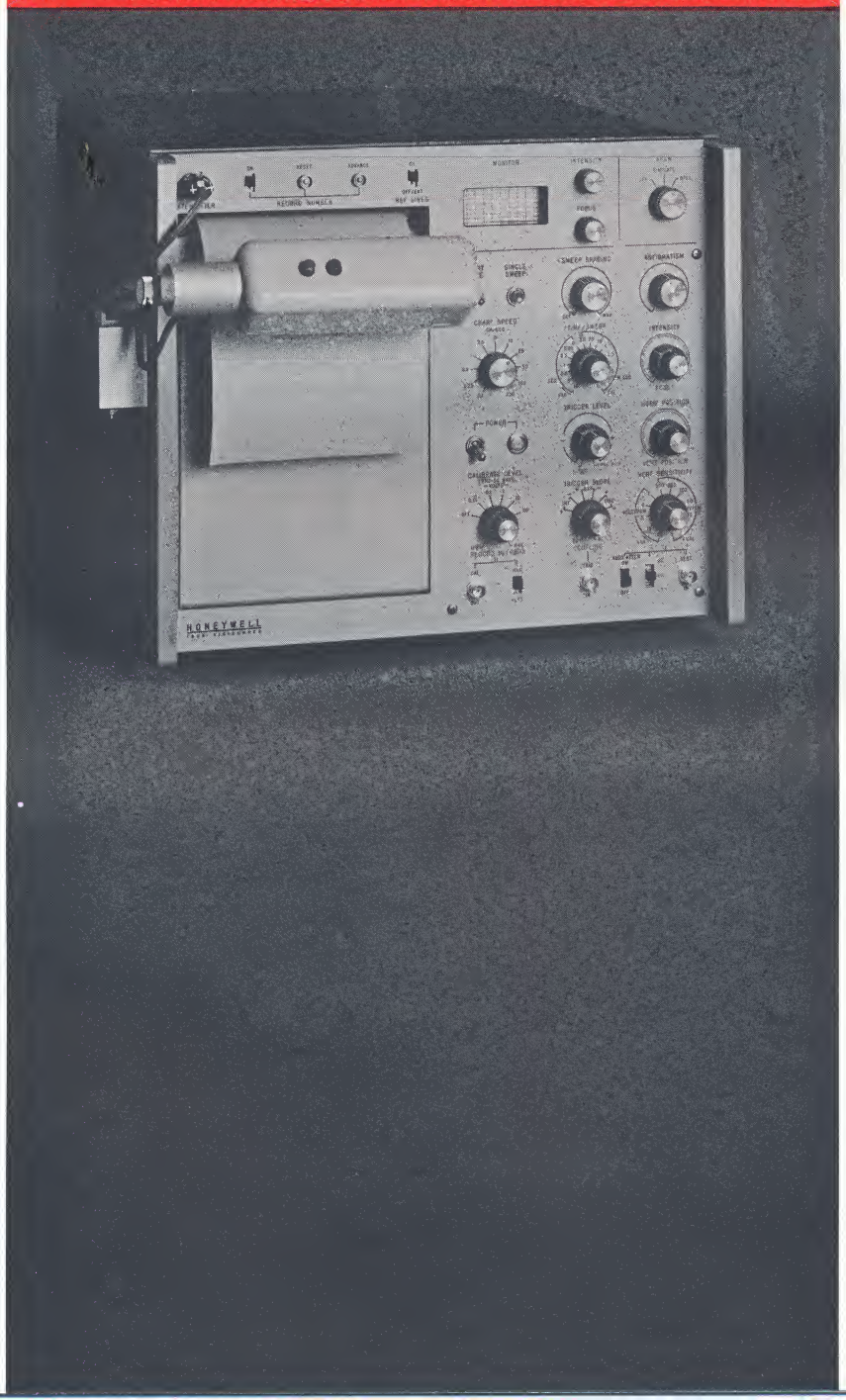
Honeywell Visicorder Oscillographs

Possible
First Line Printer
&
Pictorial Outputter

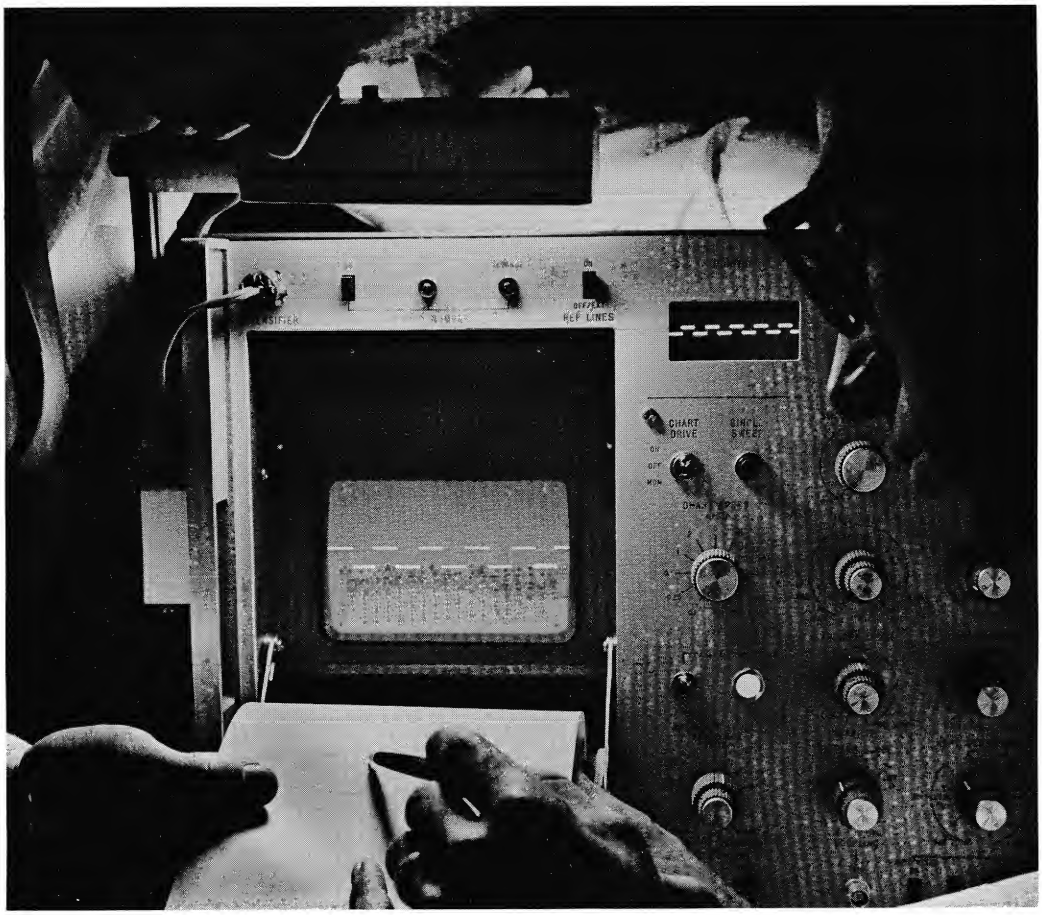
# Most significant advance in analog recording techniques since Honeywell invented the Visicorder Oscillograph



NEW MODEL

# 1806

FIBER-OPTICS
CATHODE-RAY TUBE
VISICORDER



# Honeywell's new Model 1806 CRT Visicorder

**a state-of-the-art breakthrough in direct-recording techniques! 100 times greater response than any previous direct-writing oscillograph—DC to 1MHz!**

## PLUS:

- **Choice of longitudinal or transverse presentation.**
- **X-Y plotting with 1MHz response in both axes.**
- **Video recording capability, providing continuous 3″ x 5″ raster records.**
- **XYY′Z axes recording flexibility.**

Using principles pioneered and patented by Honeywell since the introduction of the famous Visicorder Oscillograph 10 years ago, Honeywell now introduces the Model 1806 Fiber-Optics CRT Visicorder. This single-channel, 4-axes recorder, offers the capability of recording continuous or one-shot signals on 6″ direct-write oscillograph paper that previously required magnetic tape or oscilloscope-camera recording techniques.

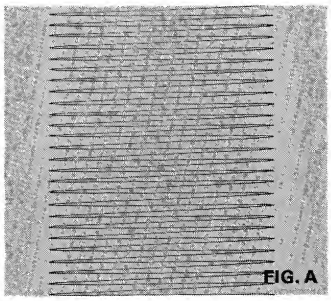


FIG. A

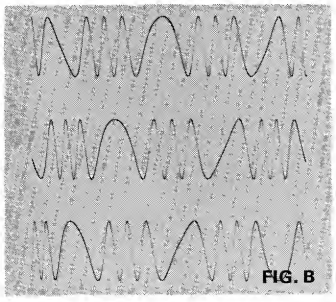


FIG. B

In the continuous mode of recording, X axis input vs. time, signals may be recorded longitudinally (fig. A) or transversely (fig. B). In the transverse mode, high-frequency data may be recorded without utilizing high paper speeds which would create costly operation.

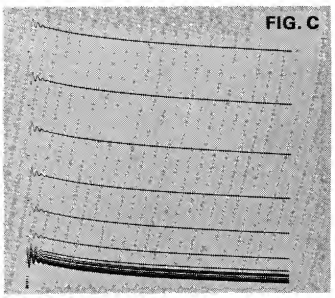


FIG. C

As well as continuous signal recording, the Model 1806 is designed for recording one-shot, transient or random phenomena (fig. C). With the application of an external trigger signal, the paper drive will automatically start and stop, thus recording the selected signals vertically along the paper. Waveform analysis or convenient comparison of repetitive information is then possible, with a minimum of paper waste. The signals may be recorded as a function of time or other parameters.

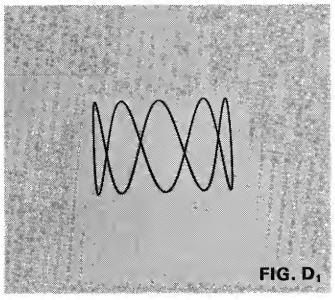


FIG. $D_1$

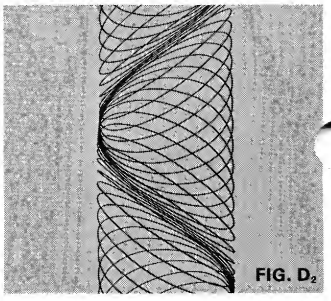


FIG. $D_2$

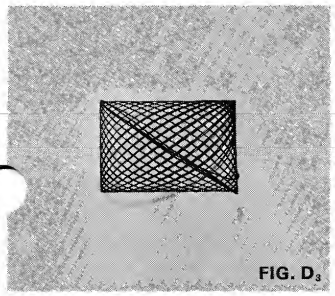


FIG. $D_3$

Utilizing both X and Y signal inputs, a single 3" x 5" or *continuous* record of X-Y plots and lissajous patterns is possible (fig. $D_1$, $D_2$ and $D_3$).

A demonstration of the XYY' recording flexibility of the 1806 (fig. E).

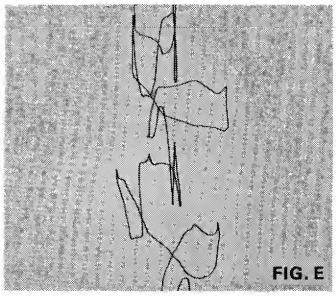


FIG. E

FIG. F

Video pictures, one frame at a time, can be presented as a continuous series of 3" x 5" rasters on the direct-record paper, for immediate viewing (fig. F). Standard non-composite video signals intensity modulate the cathode-ray beam (Z-axes) while horizontal and vertical sawtooth drive provide sweep for the raster.

**Off-the-air recording, KBTV Channel 9, Denver**

The 1806 produces these recordings by means of a fiber-optic cathode-ray tube, recording on standard 6-inch oscillograph paper. A wide range of paper speeds (0.1 cm/sec. to 250cm/sec.) and sweep controls (10$\mu$sec/cm to 2.5 sec/cm) permit individual sweeps to be recorded across the paper at almost any desired spacing. When continuously recording in the transverse mode, negligible loss of data occurs due to retrace on all but the highest sweep speeds. Compensation circuits correct any tendency of the records to be skewed due to the instantaneous motion of the paper. Reference coordinates may be optionally recorded along with the data for convenience in making measurements of amplitude and time displacement.

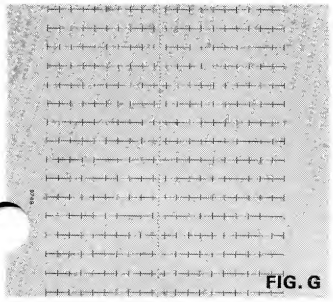
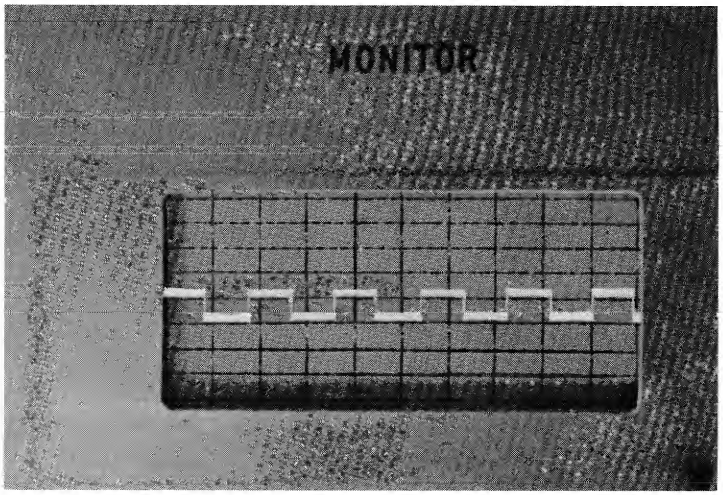
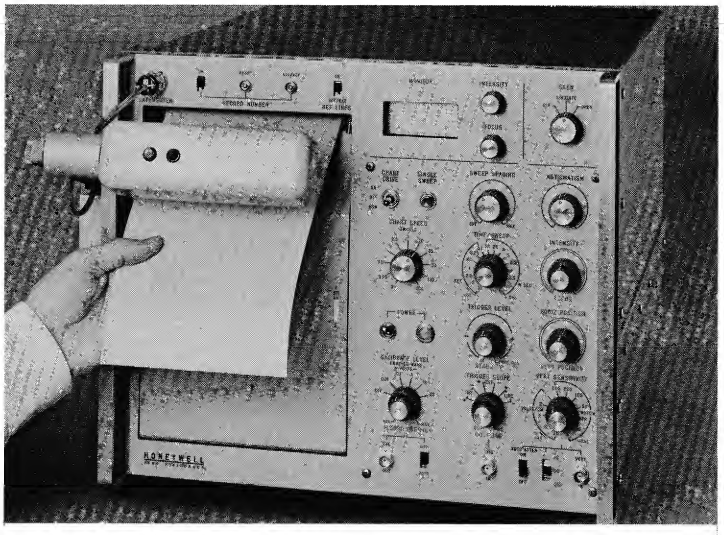


FIG. G

An internal horizontal and vertical reference mark system is automatically recorded at each cm of paper drive (fig. G). If time base reference is desired, this reference mark system may be externally/remotely driven at intervals up to 250/second. In addition, a 4-digit number is automatically recorded on the paper, sequentially, at the start of each record. This may also be printed as desired during recording cycles for event indication.




Pre-recording setup or signal monitoring is accomplished without recording by viewing the self-contained monitor scope. This provides on-line monitoring during recording cycles as well.

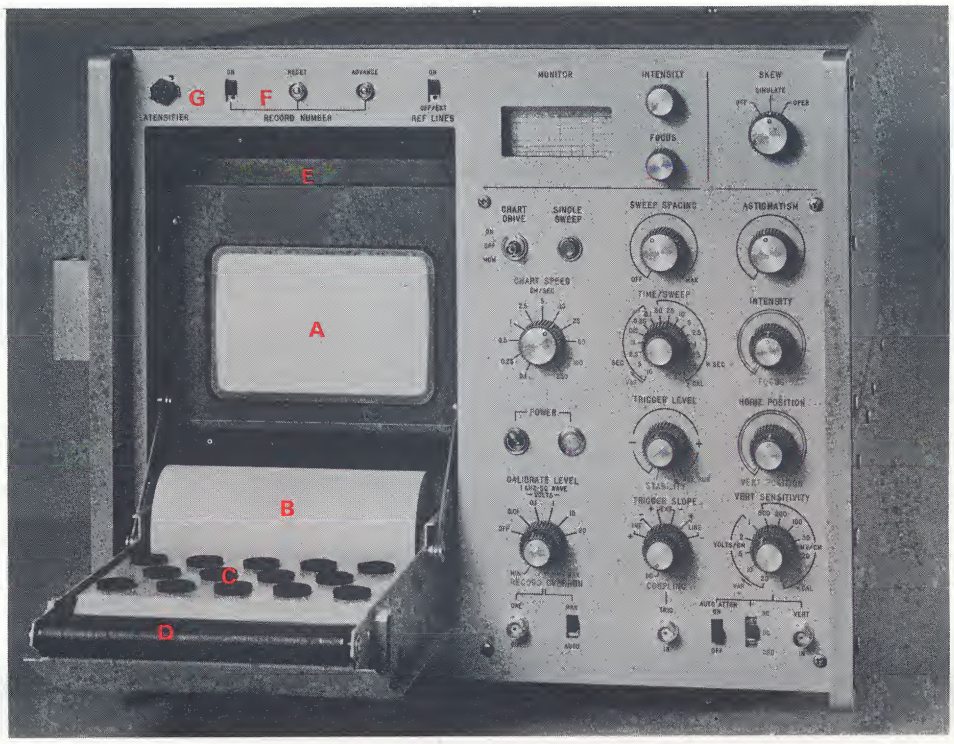


The self-contained latensifier provides quick readout of the oscillograph record as it emerges from the Visicorder.

## Exclusive features of the 1806:

- **DC to 1MHz response.**
- **350 nanosecond rise time.**
- **Writing speeds over 1,000,000 inches/second.**
- **Direct writing.**
- **XYY' and video capability (Z axis modulation).**
- **11 paper speeds.**
- **16 sweep speeds.**
- **Reference coordinates.**
- **Record numbering.**
- **Automatic record length control.**
- **Remote triggering.**
- **Automatic skew correction.**
- **Signal monitoring scope.**
- **Solid-state construction, except for CRT.**

A new era in direct recording is now possible with a new instrument that is as convenient and easy to use as a standard oscilloscope.




**A.** The 1806 features a state-of-the-art 3" x 5" fiber optic bundle CRT combination for maximum energy transmission and minimum spot size (typical 7 mils).

**B.** Drop-in paper loading – no threading necessary.

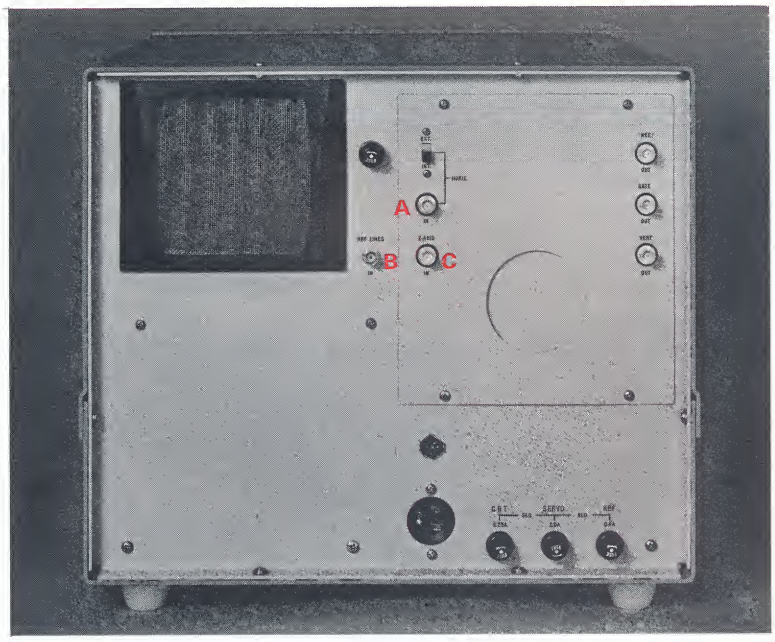
**C.** Pressure plate to assure optimum paper contact with the face plate.

**D.** Idler roller for the unique servo paper drive system.

**E.** 1cm horizontal and vertical reference mark system, automatically recorded at each cm of paper drive. This may also be remotely driven up to 250 times/second when a time base is desired instead of a distance base.

**F.** Sequential record number controls. A 4-digit number is automatically recorded on the paper at the start of each record and may also be recorded and advanced while recording continuous signals.

**G.** Connection for latensifier, *furnished with unit,* to speed trace appearance on the record as it emerges from the 1806.




**A.** Horizontal input. When in internal mode the horizontal axis is controlled by the sweep controls. In the external mode the sweep is disabled and the unit can be used for standard longitudinal recording at up to 5" peak-to-peak or for X-Y plots with 1MHz response on both axes.

**B.** Reference lines are normally based on distance of paper travel. The external input can be used to drive the reference line marker based on time at rates up to 250 lines/second.

**C.** Z-axis modulates beam intensity from DC to 3.5 MHz. When used for video recording, both Z-axes and horizontal inputs are utilized.


A. Paper supply indicator.

**B.** Access door to paper supply also allows checking and adjustment of intensity, focus, and astigmatism on the fiber-optics CRT face plate.

**C.** Monitor scope and controls. The monitor scope allows the operator to observe the signal being recorded on the direct print paper.

**D.** Skew correction. When recording in the transverse mode, the signal is tilted relative to instantaneous paper spaced to assure true horizontal presentation on the record.This correction is derived from a tachometer output in the paper servo drive system. Simulate position allows setup without running paper.

**E.** Chart drive and speed selection controls.

**F.** Single sweeps may be recorded while paper is running, or the paper can be started in sync with single sweep initiation and run a variable length of time.

**G.** A 1KHz square wave calibrate signal is available for convenience in setup and checkout. Accuracy ±2% with levels of 0.01, 0.1, 1, 10, 20 volts peak-to-peak.

**H.** Record overrun controls the amount of time the servo paper drive is on after initiation of momentary drive, single sweep, external transient, or external trigger. Servo will continue to run even though another signal is received prior to the preset stop point. Time range variable: 950 microseconds to 30 seconds.

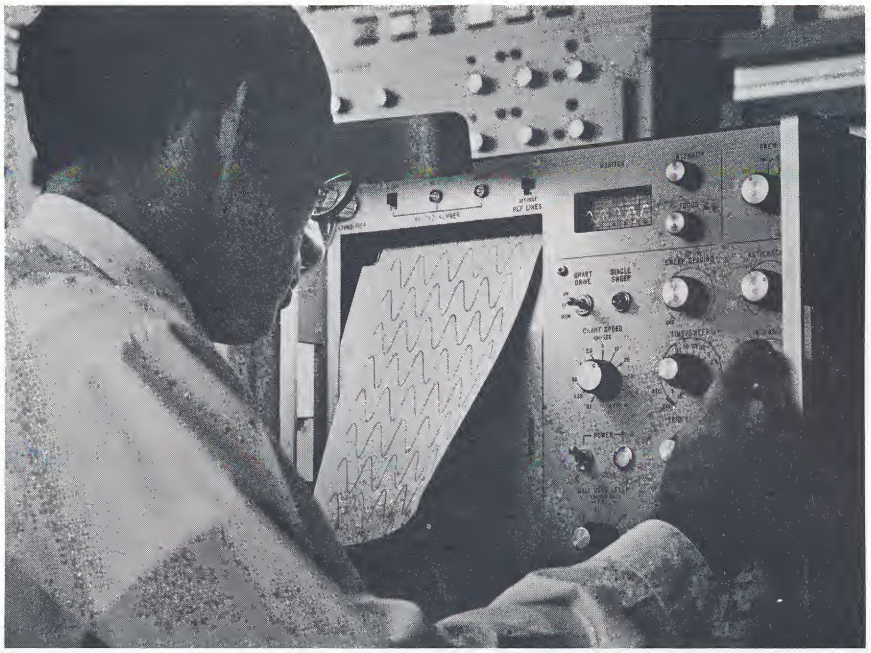
**I.** In manual position, overrun is not functional and unit operates in the standard drive mode. The automatic position enables record overrun described in paragraph H.

**J.** The automatic attenuator compresses signals in the vertical axis to a log response with a 40 db dynamic range.

**K.** Sweep spacing control adjusts the spacing between traces from ¼ cm to 3 cm minimum to prevent overlapping traces.

**L.** In addition to the standard oscilloscope controls, dynamic focus and astigmatism corrections are supplied to insure good spot resolution at any point on the fiber-optic face plate.

**M.** Automatic intensity, controls beam current to enhance 90% of the leading and trailing edge of rapidly changing wave shapes.



# SPECIFICATIONS

## VERTICAL AMPLIFIER SYSTEM

| | |
|---|---|
| Bandwidth: | DC – 100 KHz ±0.5db.<br>DC – 1 MHz ±3db. |
| Rise Time: | 350 nanoseconds. |
| Sensitivity: | 5 millivolts peak-to-peak for 1 cm deflection. |
| Input Impedance: | 1 megohm shunted by 50 pf typical, 65 pf maximum. |
| Drift: | Less than 100 microvolts/°C. Referred to input at 5mv/cm. |
| Maximum Input Signal: | AC+DC level not to exceed ±600 V. |
| Gain Stability: | ±3% |
| Input Attenuator: | Provides input deflection sensitivities of 5 millivolts/cm to 20 volts/cm in 12 calibrated steps with a continuously variable vernier control between steps. Accuracy is ±3%, frequency compensated with calibrated steps of 1, 2, 5. |
| Input Coupling: | Single-ended, AC or DC. |
| Amplitude Compression System: | The vertical input signal may be compressed by an approximate logarithmic response compression circuit with a 40 db dynamic range. DC – 10KHz. |

## HORIZONTAL AMPLIFIER SYSTEM

| | |
|---|---|
| Bandwidth: | DC – 100 KHz ±0.5db.<br>DC – 1 MHz ±3db. |
| Sensitivity: | Approximately 2 volts/cm (external). |
| Input Impedance: | Approximately 100 K ohm. |
| Sweep Range: | 10 μsec/cm to 1 second/cm in 16 calibrated steps with a continuously variable vernier control between steps. Sweep timing accuracy is ±3% in 1, 2 and 5 steps. Uncalibrated sweep times up to 2.5 sec/cm. |
| Triggering: | **Sensitivity** – 2 volts peak-to-peak external, DC-1 MHz, 1 cm deflection internal.<br>**Inputs** – Line; external (AC or DC); internal (AC or DC).<br>**Input Impedance** – Approximately 100 K ohms. |

| | |
|---|---|
| | **Controls** – Adjustable trigger level, stability, and slope. Manually triggered single sweep by pushbutton switch on front panel. Sweep spacing, continuously adjustable from ¼ cm to 3 cm (minimum) provides trace spacing to prevent overlapping records. Free running or triggered sweep.<br>**Maximum Input Signal** –<br>DC Coupling: AC+DC level not to exceed ±100 V.<br>AC Coupling: AC+DC level not to exceed ±600 V. |

## RECORDING SYSTEM

| | |
|---|---|
| Recording Paper (Spec 2, emulsion out): | Standard Weight, 6" x 100'.<br>Thin Base, 6" x 200'. |
| Paper Speeds: | 0.1 cm/sec to 250 cm/sec in 11 calibrated steps. Speed accuracy is ±5% in steps of 1, 2.5, and 5. |
| Paper Supply Indicator: | Indicates percentage of unused paper. |
| Paper Loading: | Drop-in, no threading required. |
| Record Numbering System: | A 4-digit record number is recorded on the margin of the record at the start of each recording. The number is automatically advanced one count after being recorded. The counter may be reset to zero or manually flashed and advanced by use of front panel controls. Maximum cycle rate is 3 per second. |
| Reference Line System: | A transverse reference line may be recorded every centimeter along the record. This line includes horizontal reference markers spaced 1 cm apart. The transverse reference line may also be driven by an external timing generator up to 250 lines per second. |
| Skew Compensation: | Skewing of the transverse record due to relative paper motion may be automatically compensated to produce a baseline perpendicular to the edge of the paper within ±1 mm, up to a compensation angle of approximately 20 degrees. Maximum displayed vertical signal amplitude is 3 cm for proper skew compensation. |
| Paper Drive Mode: | Manual or automatic.<br>**Automatic** – Paper drive is automatically initiated with a triggered sweep and stays on for a variable amount of time after the last sweep. If sweep triggering is recurrent, paper drive will be continuous. |
| Dynamic Focus and Astigmatism Correction: | Both corrections are provided in the horizontal axis to give good spot resolution at any point on the fiber-optics. |
| Automatic Intensity: | CRT beam current is automatically controlled to provide enhancement of 90% of each leading and trailing edge of rapidly changing wave shapes. |
| Z Axis Modulation: | The CRT beam may be intensity modulated from DC to 3.5 MHz by an external signal of 5 volts operating into an impedance of 5 K ohms. |

## FEATURES

| | |
|---|---|
| Monitor Scope: | A monitor oscilloscope is provided on the front panel for monitoring the presentation on the fiber-optic CRT. The monitor scope has its own focus and intensity controls. |
| Recording CRT Controls: | Focus, astigmatism, intensity, vertical position, and horizontal position controls are included on the front panel. |
| Input Connectors: | BNC Type. |
| Power Requirements: | 107 to 127 VRMS, 58 to 62 Hz, single phase, approximately 420 watts. |
| Ambient Temperature: | Operating: 0 to 50°C (32 to 122°F).<br>Nonoperating: −55 to +60°C (−48 to +140°F). |
| Dimensions: | 14" high x 16¾" wide x 22¾" deep. |
| Weight: | Approximately 120 lbs. |
| Mounting: | Heavy duty ball-bearing slide mount unit in a standard RETMA rack cabinet, 24" deep. May also be used as a table model unit. |

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